

The Interaction Point

Events and Happenings
in the SLAC Community
October 1995 Vol. 6, No. 10



PHYSICS NOBEL AWARDED TO MARTIN PERL

by Trevor Payne

AROUND 4:30 AM on October 11 the phone rang at the Perl home. When Judy Finer told her husband, Martin Perl, that someone was calling to tell him he had been awarded the Nobel Prize in physics, Martin didn't believe it—"Ask her what her source is," he told Judy. By now, of course, he believes it—SLAC's Martin Perl shares the 1995 Nobel Prize in physics with Frederick Reines of UC-Irvine—Martin for his discovery of the tau lepton in 1975, Reines for the detection of the neutrino (with work that started in the 1950s).

In his youth Perl looked at the world as a giant toy construction set. His parents immigrants, his father a Brooklyn businessman, Perl was raised to think of the world in practical terms.

"I was always interested in mechanical things as a kid, building things, wondering how things worked." Perl said. "And I was very good at mathematics in high school, but at the time, which was actually before the Second World War, it wasn't clear to me that you



Tom Nakashima

Martin L. Perl

could make a living doing research."

Perhaps because of his early outlook, Perl's route to physics was somewhat circuitous, first passing through the field of chemical engineering. According to Perl the field was very big in the post-war days, and practical; nylon had just been invented.

Perl found himself in the no-frills working class city of Schenectady, New York, working for General Electric, and taking classes at Union College, where he discovered that what he really wanted to think about wasn't at all obvious to the eye, or as practical as nylon.

"I just talked to some professors there, and they said: 'Look, what you're interested in is called

physics.' So, I went back to school at Columbia."

Perl received his Ph.D. from Columbia in 1955; he then taught for eight years at Michigan before coming to SLAC in 1963 to follow the path that led him to his remarkable discovery of the tau lepton.

Perl's progress in physics followed a path similar to his route to the field in the first place. His wasn't at all the romantic notion of a sudden insight into Nature's composition. He only began to approach the line of thinking that led to his discovery after years of hard work. These simple particles weren't immediately forthcoming.

"I worked originally here for about five years on the electron and the muon," Perl said. "I was trying to see a relation between them, and I couldn't make any progress."

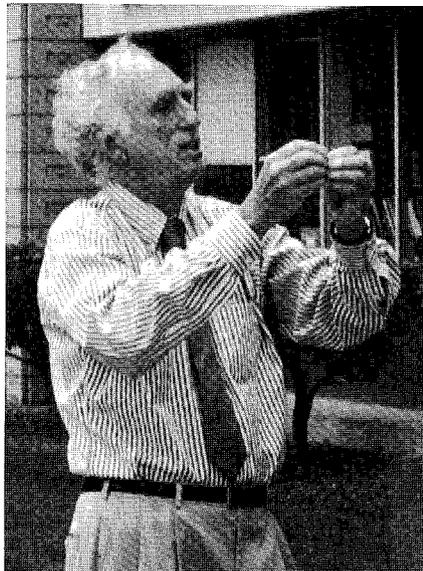
This period of stasis pushed Perl to look for a heavier lepton, a close cousin of the electron and muon.

"I was convinced that there were many heavier ones, not just the tau, but more and more and more," Perl said. "I liked this idea of sequence, that there was the electron, the muon, the tau, another one, another one, and getting heavier and heavier."

Wolfgang Panofsky, director emeritus at SLAC, remarked, "The discovery, even though it was not totally serendipitous, nevertheless was totally unexpected by the

Check out SLAC's *Hot Topic* on the World Wide Web at <http://www.slac.stanford.edu/slac/hottopic/mperl95/mperl95.html> for more text and photos about Perl's Nobel Prize, the work that resulted in the award, and information about the history of the Nobel Prize itself.

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P.A. Moore

During the October 11 press conference Perl used two coins to illustrate positrons and electrons colliding to create the tau.

community." Perl's hunch had not been predicted by theory. "There was no good reason at that time, no good theoretical basis, to believe that there should be three generations of leptons rather than two."

Panofsky continued, "The thing that made it tenuous is that nobody understood why there was a second generation, why the muon existed, and since nobody

understood why there was a second generation, people said maybe there's a third or fourth or fifth. The theory was no more settled than that."

But Perl was undaunted. Using SPEAR, SLAC's ring-shaped collider, Perl set out to find evidence for the tau. He collided positrons and electrons and looked at the debris to find evidence of a new heavier particle. He had a hunch that if he saw an electron and a muon formed from the same collision it could be that heavier particle. "I knew that if we saw that funny thing, it would be something new and unexpected," Perl said. "I didn't know whether or not it would be there, but when I began to see the signature, I said that's got to be what we found.

"When electrons and positrons annihilate many things happen. If you weren't looking for $e\text{-}\mu$'s, you wouldn't have noticed them, because it's a small effect."

However, after he found the tau he had to embark upon a campaign to prove to the skeptical physics community that what he found was indeed a new particle. Perhaps one of Perl's remarkable abilities is his persistence and grit. He was transplanted from New York, but he never lost his big city

intensity or personal fortitude. He opened himself up to two years of steady criticism before he assured himself that his discovery was genuine.

According to Panofsky, Perl was the model scientist in proving the tau was in fact real. "The thing which I liked very much," said Panofsky, "is that he didn't do what others had done, keep it terribly secret until finally springing it on the unsuspecting world.

"Rather, what he did was share his self doubts with the wider community, and didn't try to scoop anybody, but basically exposed his stuff to lots of criticism from others. As time went on he convinced himself and others simultaneously that it was real."

Even though Perl's discovery had little to do with luck, and despite his personal drive to prove his findings, he downplays the role of individuals in the scientific process. Creativity to him is an overrated concept.

"Creativity is a weird business," Perl said. "You can't ever tell about it. I have had many ideas since the tau and many before it. None of the others have worked out as well."

According to Perl, a scientist is at the whim of nature—a good idea doesn't always pan out. "If you think about something that Nature may have, and Nature doesn't have it, that's it." For this reason, the cult of personality surrounding some figures is distasteful to Perl.

"There's too much made of creativity and great people in science. If I hadn't found the tau, it would have been found a couple years later by somebody else. If great people such as Einstein hadn't made their contributions, eventually others would have done the same work. And that's different



P.A. Moore

SLAC and Stanford have each been honored with three Nobel Prize winners in physics. Four of the six Nobel laureates were present at the announcement of Perl's award; they are (left to right) Dick Taylor (1990), Burton Richter (1976), Arthur L. Schawlow (1981), and Martin Perl (1995). Richter challenged the Stanford physics department to a race for a fourth Nobel.

See **Nobel**, Continued on page 4

Scientific background to discovery of tau lepton

WITH THE DISCOVERY of the ψ/J in 1974, the quark model seemed to be complete. The fundamental constituents of matter could logically be grouped into families each containing two quarks and two leptons (u, d, e, ν_e and c, s, μ, ν_μ). Ordinary matter is composed of particles from the first family, the proton (uud) and neutron (udd) are composites made of quarks, and the electron is the lightest fundamental charged particle, hence the name "lepton," which originally meant "light particle" but later came to mean a fundamental particle that does not participate in strong interaction processes. (The generic term for particles that do have strong interactions is hadrons, and all hadrons are, like the proton and neutron, composed of quarks.)

The particles of the second family are a repeat of the pattern of the first in every respect, except that they are more massive, and hence unstable. While there was no explanation for the existence of repeating families of fundamental constituents, the new arrangement made possible by the discovery of the charm quark seemed more complete and symmetrical than that which had existed before. Since no one understood why there were two families, some speculations that there might even be more arose, but few scientists took them very seriously.

However, in 1975, Martin Perl, working with data from the MARK I collaboration on the SPEAR storage ring at Stanford, announced evidence for the production of events containing both electrons and muons. These events signaled the production of a new heavy lepton that could decay to produce either electrons or muons, along with associated neutrinos. The first discussions of these



Tom Nakashima

Graduate students Nancy Mar (left) and Eric Lee with Perl in the lab at SLAC where they currently conduct experiments looking for free quarks (fractionally charged particles). These students are part of the new generation of scientists that Perl predicts will carry on the important work of finding more answers to the nature of the universe.

results occurred at conferences in 1975 and the first paper appeared in *Physical Review Letters* in 1975. More data from the SPEAR storage ring and from the DORIS storage ring at the Deutsches Elektronen Synchrotron (DESY), located near Hamburg in Germany, in the period from 1975–1978 confirmed the discovery and the interpretation of the muon-electron production process as arising from a new heavy lepton, the tau (symbolized by the Greek letter τ , to follow the greek letter μ for the muon) together with its antiparticle. According to the pattern of the first two generations, such a particle will also have an associated neutrino type, which will be produced whenever it decays. All the observed τ processes are consistent with this interpretation.

The discovery of the τ came as a complete surprise to the physics community and signaled, if one was to believe in the family idea,

the discovery of a third family of fundamental constituents that had to be accompanied by the appropriate quarks. Lederman and collaborators at the Fermi National Accelerator Laboratory found evidence for the charge $-1/3$ quark (b) belonging to the family in 1976. Evidence for the existence of the much more massive t , or top quark, has come from Fermilab in the last year.

Perl's interest in lepton physics predates his work on the MARK I experiment on the SPEAR storage ring. In 1963, Perl moved from a faculty position at the University of Michigan to one at the Stanford Linear Accelerator Center, and this move marked a change in the direction of his experimental research. Before the move his experimental work had concentrated on hadron physics experiments; afterward he concentrated on lepton experiments. His first

See **Background**, page 4.

Background, *Continued from page 3.*

experiment at SLAC was a search for long-lived massive leptons [*Physical Review*, **173**, 1391 (1968)]. He then began a series of muon inelastic scattering experiments, searching for differences in the behavior of muons and electrons through their inelastic scattering cross sections [*Physics Letters*, **36B**, 251 (1971)].

In 1970, Perl joined forces with Burton Richter, also of SLAC, and with Willy Chinowski, Gerson Goldhaber, and George Trilling of Berkeley, to build the MARK I detector for experiments at the SPEAR electron-positron colliding beam storage ring at SLAC. Perl's main interest continued to be in new leptons. For this reason he and his group were responsible for the inclusion of a muon identification system in the detector, which was crucial for this discovery. Perl concentrated his analysis on the heavy lepton search from the time that the first data began to come in late 1972. His first public presentation of the results on what was then called anomalous electron-muon events was given in 1975 at an international conference in Montreal, and the first publication was also in 1975 [*Physical Review Letters*, **35**, 1489 (1975)].

Looking back on that period from the perspective of almost twenty years, it may be hard to understand why the discovery of these electron-muon events was not immediately accepted by the scientific community as evidence for a new lepton. To understand this, one has to note that the masses of the new lepton and of the recently discovered charm quark were very close together, and so it was hard to separate the energy thresholds for the production of these two new kinds of particles from each other with the relatively unsophisticated detectors of that day. The period from 1975 through 1978 was one of confirmation of Perl's original measurements by other experiments at SLAC and at DESY. Critical to this confirmation was a search for evidence for the other decay modes that would be expected for such a heavy lepton. These decays produce light hadrons, such as pions, in addition to the unseen tau neutrino.

By 1978, Gary Feldman, in his summary talk at the XIX International Conference in High-Energy Physics in Tokyo, could give the fractions of tau particles which decay to each of several possible sets of particles, including both the originally observed muon and

electron modes and a number of modes with hadrons. These measurements were in general agreement with the calculations by Y. S. Tsai [*Physical Review D* **4**, 2821 (1971)]. Tsai's paper was the "bible" of theoretical predictions for the pattern of heavy lepton decays expected if the third generation was a repeat of the pattern of the first two. With these results in hand, Perl's anomalous e -mu events were generally accepted as being from the decay of a heavy lepton, which was given the name tau (symbolized by the Greek letter τ , to follow the greek letter μ for the muon). Subsequent experiments have continued to confirm this interpretation.

Perl's role in the discovery of the tau lepton is central and marks the high point of a very long interest in an experimental program on lepton physics. His determination to search for something which his colleagues regarded as a "long shot" led to an important advance in our knowledge of fundamental particles. Recent experiments at SLAC and CERN on Z decay have shown that there are no more "standard" families of quarks and leptons.

—Burton Richter and Helen Quinn

Nobel, *Continued from page 2.*

from literature or music. There's only one Beethoven; there's only one Tolstoy.

"The main thing about creativity is that it is no fun to do what everybody else is doing. Why bother?"

However, no one denies that Perl was the driving force behind the discovery of the tau, his passion and desire carrying his intuition through those two years of doubt. He is known for his fiery personality in those years, a trait which when looking at the nature of his discovery was essential. Perl

notes this about himself, but he says he has mellowed.

"I was pretty tough when I was young; I came from New York City. What I've learned is that one has to control it, conceal it. You have to live with people.

"The other thing is that as you advance it's not fair. Most people you come into contact with are younger or work for you, so it's not fair to yell at them."

Panofsky remarked on the change that Perl himself noted. "He is a very different person. He's statesmanlike. He was chairman of a National Academy of Sciences panel. He's been very

conscious of the need to participate in the public service, to, if you will, repay his debt to society. And he's certainly mellow."

Away from physics, Perl likes to swim and garden as well as tinker with mechanical things. He has developed a version of an erector set, for which he is now waiting on a patent. His is made of wood and has big nuts to make it easier for the kids to use. "I have always liked the mechanical era, which is gone now," Perl said. "These things take you back there."

SLAC telescope flies on NASA trip

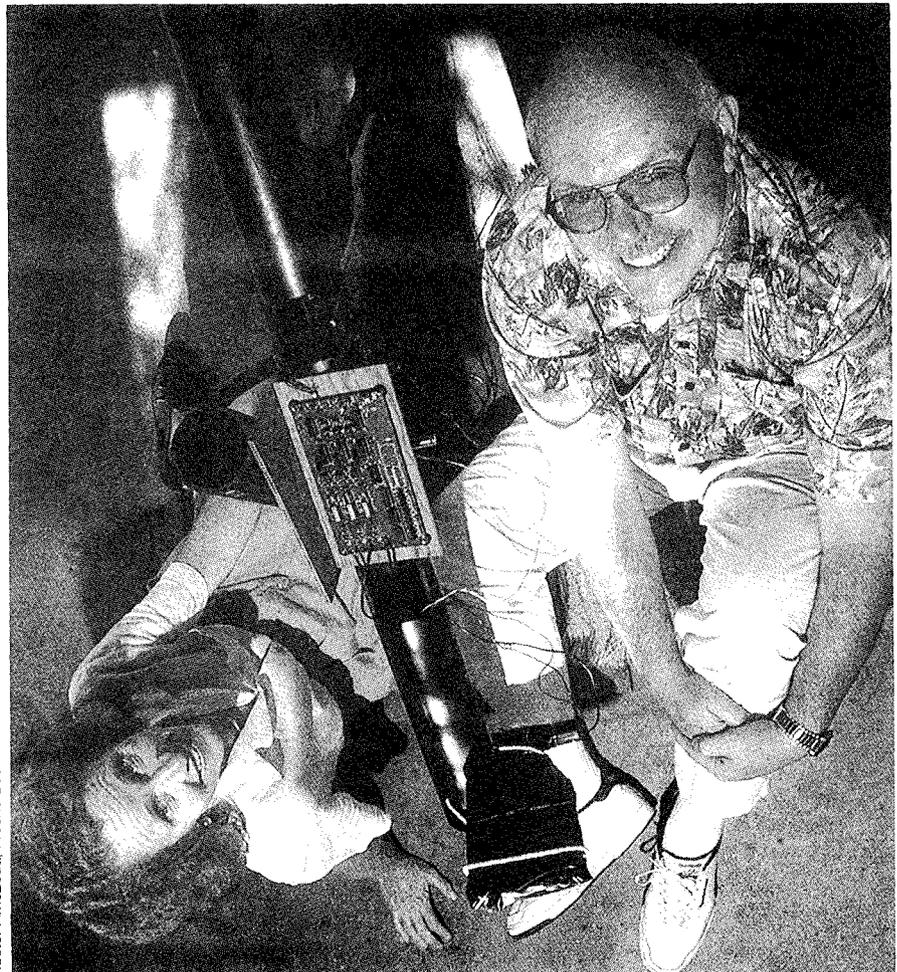
STEVE KLIEWER, a high school physics teacher from Fresno, attended a SLAC workshop on particle physics in summer 1993 and learned about an instrument called a compact cosmic-ray telescope (CCRT). Little did he realize then that he and SLAC's CCRT would be part of a NASA flight in summer 1995.

Kliewer was part of a NASA-sponsored program for teachers called FOSTER (Flight Opportunities for Science Teacher Enrichment) on board the Kuiper Airborne Observatory (KAO). The plane is equipped with a 36-inch telescope for scientific observations at night.

In addition to the NASA telescope, Kliewer used the CCRT to chart the difference in cosmic rays at various levels up to 41,000 ft. The CCRT is composed of a photomultiplier tube and scintillator that flash when a high-energy particle enters. These flashes are then counted by an electronic panel, and data are collected for analysis. Kliewer was interested in determining if cosmic rays increased with altitude. If so, he theorized that there may be complications for pilots who regularly fly high-altitude missions, or even commercial airline passengers.

The KAO took off from Hickam Airforce Base in Hawaii at 9:15 PM. At hourly intervals starting about an hour before takeoff, Kliewer recorded pulses on the CCRT. This baseline measurement was about ten counts per minute. Once airborne, it was quite a different story.

"I was overwhelmed at the rate the counter was saturated. I thought something was wrong with the instrument and suspected damage or a maladjustment. But it was soon clear that the CCRT was operating perfectly. It was just that the intensity was much higher than I expected." During the



Hector Amezcua, Fresno Bee

Fresno teachers Jean Roberts of Tenaya Middle School (left) and Steve Kliewer (right) of Roosevelt High School with the compact cosmic-ray telescope.

eight-hour flight, Kliewer measured how long it took for the scintillator counter to reach maximum. His data are now being analyzed and have been sent to SLAC

staff involved with the design and construction of the instrument: Willy Langeveld, John Venuti, and Steve Shapiro.

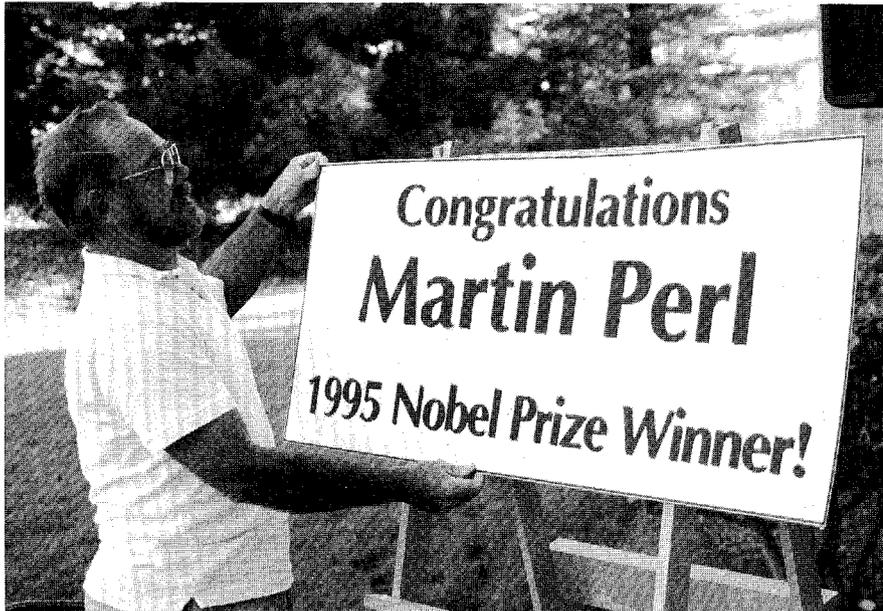
—P.A. Moore

Welcome Guests and New Employees

Joseph Christy, Waste Management; **Patricia Prickett**, Power Conversion; **Sharon Holmes**, Klystron; **Christian Back**, Physical Electronics; **Martin Beneke**, Theory; **Paola DeCecco**, SSRL; **Yaroslav Derbenev**, Accelerator Theory & Special Projects; **Arthur Hebecker**, Theory; **Olivier Napoly**, Accelerator; **Damien Pierce**, Theory; **Jochen Schwiening**, Experimental Group B; **Adrian Signer**, Theory; **James Wells**, Theory; **Stephane Willocq**, Experimental Group B; **Mihir Worah**, Theory; **Michael Buenerd**, Experimental Facilities; **Jun Yashima**, SLD; **Tohru Takahashi**, Experimental Group I; **Hope Erikson**, SSRL.



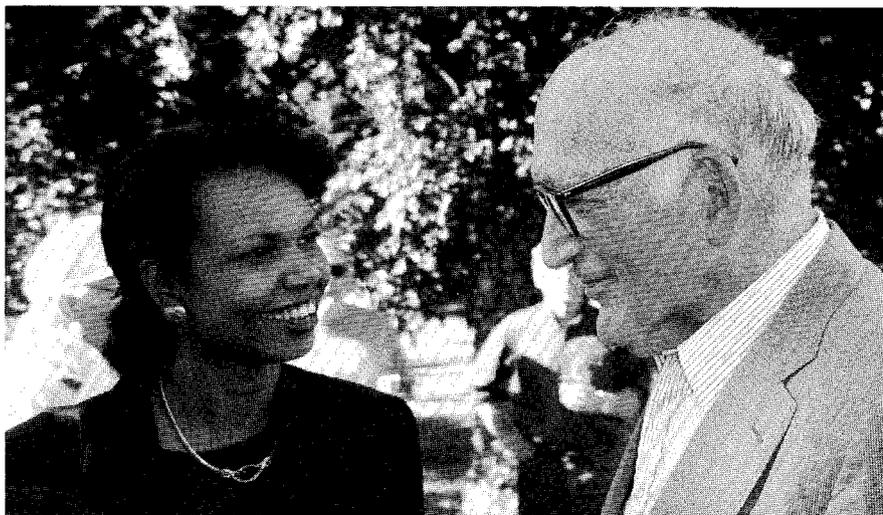
P.A. Moore



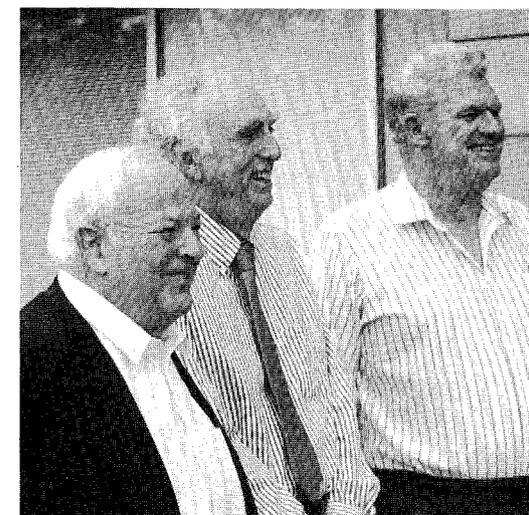
P.A. Moore



E.- Eldridge-Diaz



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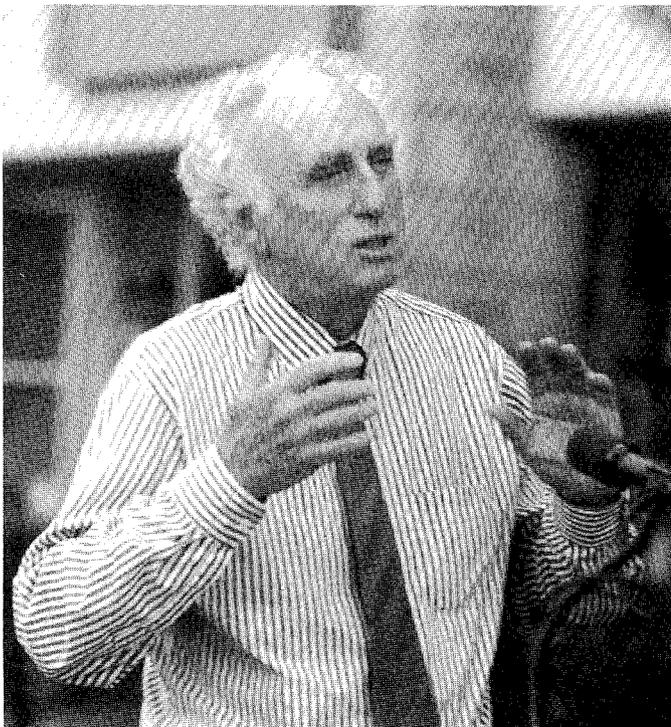
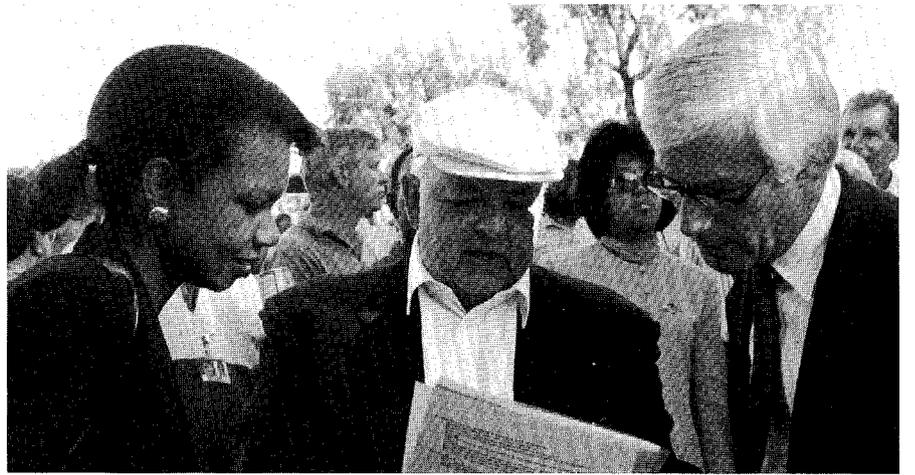
Top row: SLAC employees gathered on the front steps of the Central Lab to watch the press conference for Martin Perl's 1995 Nobel Prize for physics. Middle row: (Left) Jim Wahl (Tech Pubs) places congratulatory sign. (Middle) Judy Finer, Martin Perl, Steve

Chu of Stanford, and Rita Taylor at the afternoon celebration. (Right) Provost Condoleeza Rice of Stanford, Director Burton Richter, and Stanford President Gerhard Caspar. Bottom row: (Left) Condoleeza Rice and Sid Drell. (Middle) SLAC's three Nobel laureates—

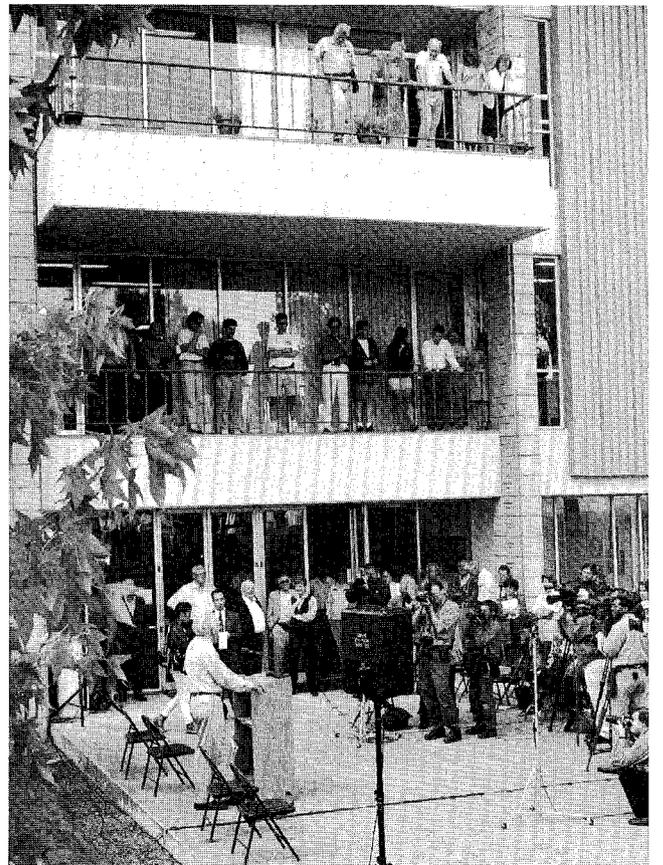
Burton Richter, Martin Perl, and Dick Taylor. (Near right) Martin Perl. (Far right) The Central Lab balconies were the place to be for the press conference.



E. Eldridge-Diaz



Tom Nakashima



P.A. Moore

The Cassandra Experiment

Mother–daughter team gets the job done

THE PEP-II DIVISION has embarked on a new experiment, and the rings have not even been completed. The new namesake of the experiment, christened Cassandra, weighs 12 pounds, is approximately 23 inches long, and is only a few weeks old. The experiment itself is in on-site infant care and Cassandra is the baby daughter of Regina Matter, the administrative associate to Dona Jones.

Dona says that the experiment came about for an entirely selfish reason—Regina is a very productive, efficient member of her team, and Dona wanted her back as quickly as she could safely return. There was another reason. Dona believes that the work place should be progressive. She says that, while change can be difficult, it is also inevitable.

According to Dona, “What it really comes down to is the way that you approach a situation, especially one involving change. Changes in the workplace can be more challenging for some than others. It is much better to deal with reality, to say, ‘This is the right thing and it’s what I’m going to do.’ In this case, the right thing for my team as a whole was to make a progressive decision to get one of the team members back to work as soon as possible.”

Dona also knows that the transition period between giving birth and returning to work should be a gradual one, with time for both the mother and the baby to adjust to a working schedule. A new mother should not have to suddenly walk away from her baby one day to return to work. While Dona wanted Regina to come back as soon as possible, how could she with a new infant? The solution to this particular problem did not just



Gene Holden

Regina Matter and her daughter, Cassandra, conduct another type of experiment at PEP-II—a trial of on-the-job childcare.

happen. A lot of planning went into this “experiment.”

Jonathan Dorfman (Associate Director for PEP-II), Dona, and Regina sat down and discussed the issue at length. During the meetings, they set very clear guidelines. The transition period could last no longer than a month, with Regina insisting that, if even one person complained, she would immediately place Cassandra into child care. Several people in the PEP-II building were asked what they thought of having the baby in the work area. The answer was unanimous—they never hear or see the baby, so it is not an issue. John Rees, who sits right next door, said that having

Cassandra there has been “of no practical consequence.” Work has continued without interruption.

Dona says that, if anything, people have come over and asked to see the baby—because she is so unobtrusive they can’t find her. Regina, however, keeps a very tight reign on visits. While she appreciates that people love babies (and Cassandra is pretty cute) she is very aware that she is here to work. Regina has a baby monitor in her office, and carries the receiver with her. This way, she is not tied to her office. She can work at the front desk, attend meetings, make copies, or plan events, just as she did before Cassandra’s

See **Experiment**, page 9

Experiment, continued from page 8.

arrival. When she needs to leave the building Regina simply takes Cassandra with her. They both get some fresh air, a few extra moments together, and the job gets done.

I asked Regina what type of response she gets from people when she is out and about with the baby. She says that most people think she is just visiting. When she tells them she is actually working, people are surprised—pleasantly. They all say, “Really! That’s wonderful!” Regina says that she has heard absolutely no negative comments. I even had one young single man say to me that it made him feel even more proud to work here than before, to discover that SLAC is really being progressive.

Some people who knew Regina before she had Cassandra were a little surprised when she first came back, because she discouraged them from playing with the baby or chatting. Regina says that she had to let them know that it

wasn’t personal, but she really didn’t have time to chat, she had to make sure her work was done. Regina feels “so lucky and thankful to Dona and Jonathan for allowing me to do this. I don’t want anything to mess up this opportunity to be with my baby and to be at work at the same time.”

Regina believes that since returning to work with the baby she has become even more organized and efficient. She says she has become very aware of time management. Dona agrees. She says that “Regina is, if anything, more productive than before. She gets her job done in a professional manner. She has been here every day, not missed any time, never been late, and has been super-productive. There is no part of her job that I would not ask her to do.” Dona believes that a large part of the reason for this is that, quite simply, Regina is not worried about her child.

Dona, however much a humanitarian, is also a pragmatist. She

knows this arrangement might not work for everyone or in every situation. “It depends on the situation, the people involved, and it definitely depends on the personality of the baby. A cranky or crying child in the workplace would not only be distracting, it could lead to a non-productive atmosphere. Regina has the good sense to know if it isn’t working, and she will do something about it. That’s not true for everyone. It’s also easier to deal with an infant situation than with older children. Child-care is a large issue, and it is an on-going need for working families. Progressive companies have recognized the need and are beginning to offer childcare in the workplace.”

A lot of people would agree with Dona on this issue. Employers who are looking toward the future expect their employees to be even more flexible than ever before. Providing ways to be flexible might be a good way to start.

—Gene Holden

Zdarko named BCS group leader



E. Eldridge-Diaz

Richard Zdarko

RICHARD ZDARKO recently became group leader for the Beam Containment System (BCS) in the Controls Department. The BCS is the main safety system that prevents the accelerator from destroying itself or anyone else.

Zdarko received his Ph.D. from Stanford in 1972, after which he spent about eight years as what he calls a “mercenary physicist”—consulting, teaching at Stanford and Hayward State, and working at SLAC and other physics labs in various capacities. Zdarko says that he values that time because he gained experience and versatility as a physicist in both the experiments and the operation of the machines that conducted them.

In 1980 Zdarko was hired to work on the magnetic calorimeter

(MAC) at IR4, a prototype for all the large detectors that are being built now. He worked at MAC until 1986, then at SLD until 1993.

In 1993 Zdarko transferred to Controls where his experience and flexibility have resulted in his promotion to group leader.

—Evelyn Eldridge-Diaz

Corrections

TWO ERRORS were made in photo captions in the September 1995 *Interaction Point*. On page one in the bottom photo the woman talking with Sid Drell is Cynthia Nitta, not Carina Chiang. On page eight the fourth name should read Karen McClellan, not Karen Campbell.

Nuckolls heads new department in ES&H

EFFECTIVE SEPTEMBER 1, Helen Nuckolls became department head for Environmental Protection and Restoration, a new department within ES&H. In May the Environmental Protection (EP), Environmental Restoration (ER), and Waste Management (WM) groups of ES&H were restructured into two departments, the Environmental Protection and Restoration (EPR), and Waste Management (WM) departments. Michael Scharfenstein was promoted to department head for WM.

EPR is split into two groups, the Environmental Protection Group and the Restoration Group. The Environmental Protection Group is responsible for pollution prevention and ensuring that SLAC remains in compliance with environmental protection laws and regulations. The Restoration Group is responsible for cleaning contaminated areas at SLAC.

Helen received her undergraduate degree in geology from UC Berkeley, and her masters degree in applied earth sciences from Stanford. She worked for Woodward Clyde Consultants as task leader for geochemical studies for the high-level nuclear waste disposal in the salt beds near Canyonlands, Utah, and was involved in the restoration of contaminated soil and groundwater sites throughout the western US. Helen first worked at SLAC in 1991 as a groundwater consultant from Earth Sciences Associates. She was hired by SLAC in 1992 and became the Group Leader for ER in 1993.

Helen, who is from Livermore, says her first love was natural history, especially field geology. Her parents are both scientists. Her



Helen Nuckolls

father, John Nuckolls, was the director at Lawrence Livermore National Laboratory (LLNL), and her mother, Ruth, was a chemistry teacher who now works at LLNL as a chemist. Her mother took both Helen and her brother on geological field trips when they were children. While studying at Berkeley, Helen became interested in ore geology, particularly as it relates to the evolution of earth atmosphere, biology, and geology. At Stanford, Helen did her thesis on the geology of a gold deposit in Nevada.

Helen says she loves the field because it's a puzzle, a mystery waiting to be solved. According to Helen, "You have to fit the right pieces into the puzzle, otherwise things just don't fit what the data tells us." She uses many investigative methods, including surface geologic mapping, drilling, and remote technologies to solve the puzzle. For example, Helen was working for Woodward Clyde in

the summer of 1987 when a petroleum company asked for help. They had evidence that at least one of their large storage tanks was leaking, but were not sure which one, how much oil was being lost, or where the oil was going. Helen was asked to determine which tanks were leaking, and to define the rate and direction of contaminant flow in the subsurface.

After piecing together different parts of the puzzle, Helen believed the contaminant flow was being influenced by unusual geology. She decided to drill a series of wells to test her theory and struck oil. It turned out that owing to the structural geology, the oil ran sideways instead of downhill. From the evidence gathered, Helen was able to predict which tanks were leaking.

Helen will be applying her extensive experience to restoration of groundwater contamination sites at SLAC. She says she enjoys her job and hopes to have some time to do research in the area of restoration.

Helen lives in Palo Alto with her husband Steve. In their spare time, they visit Canyonlands, Mt. Lassen, and other areas of geological interest. Both are avid cave crawlers. Helen and Steve are Volunteers in the Park (VIPs) for Lava Beds National Monument. One of their projects involved Helen, Steve, and a friend rappelling into an extinct volcano cone. They cleaned out debris to prove that two of the three cones were actually connected at the sub-surface. That's what is known as getting "into" your work.

—Gene Holden

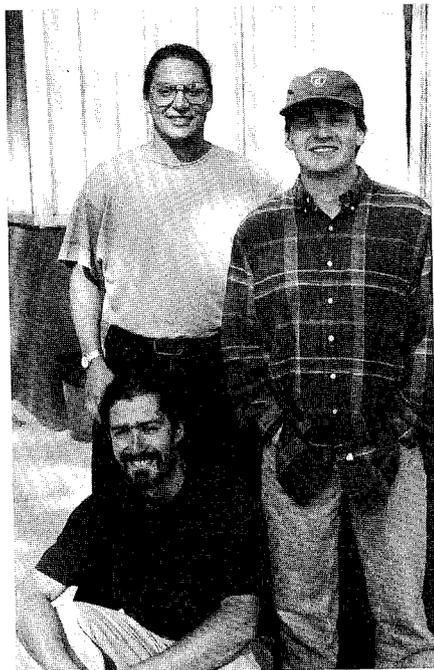
Ruth McDunn

Spotlight on SLAC tour guides

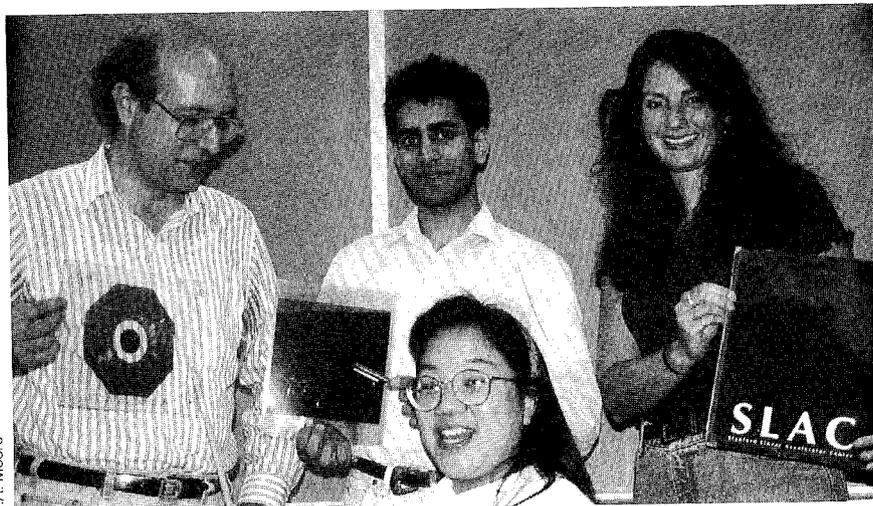
TODAY, HIGH SCHOOL students. Yesterday, German engineers. Tomorrow, who knows?

If one word sums up the life of the SLAC tour guide, it's *flexibility*. Graduate students who conduct SLAC tours must be prepared for everything and everyone, and questions to match. With over 10,000 people participating in SLAC tours every year, tour guides are in an ideal position to build public awareness and confidence in big science. Tour guides come from a variety of universities around the country and are conducting research with the various experimental groups as part of their doctoral programs.

Tour guides are asked about radiation, SLAC's role in maintaining the environment, and the Big Bang Theory, among other things. At a recent workshop on presentation skills, guides got practice in handling basic types of questions from an audience. P.A. Moore,



Tour guides (left to right): Steve Churchwell, John Coller, David Reyna (seated).



P. A. Moore

Tour guides (left to right): Jose Martinez, Mandeep Gill, Robin Erbacher, seated center Nancy Mar.

workshop facilitator, commented, "There are strategies in public speaking to deal with the emotional, argumentative, nit-picking, or just plain confused person. Identifying the type of question and learning techniques to deal with each type can make a question-and-answer session much easier."

Tour guides are experimentalists John Coller (Boston University); Steve Churchwell (University of Massachusetts, Amherst); Nancy Mar, Tom Junk, and Robin Erbacher (Stanford); Jose Martinez (Cincinnati University); David Reyna (American University); Todd Smith (University of Michigan); Peter Tenenbaum (UC Santa Cruz); and Eric Weiss (University of Washington, Seattle). Mandeep Gill from UC Berkeley is the only theorist among this year's tour guides, and he is working with SLAC physicist Stan Brodsky.

What's the most common issue that arises on a tour? According to Jose Martinez, who has been conducting SLAC tours for several years, it is "dealing with people who have totally wrong ideas about physics." Much of what he does is try to correct the misconceptions people have.

Other guides comment on the disparity between groups: technical engineers who want detailed information versus public interest groups who want an overview in plain language. "Short, good analogies are important," says Robin Erbacher.

Nancy Mar's goal is to help the young women in the tours feel comfortable. She encourages them to sit up front in the auditorium and to ask questions. She says, "I want to let teenage girls know that they're allowed to be interested. Too many girls feel that interest in science isn't cool."

Public tours take about two hours. They start in the auditorium with a presentation of SLAC facilities and an overview of the physics being done here. The second half is a tour of the facilities, usually including the Klystron Visitors' Gallery, End Station A, and the Collider Hall.

Tours are coordinated through the Public Affairs Office. To arrange a special group tour contact Pauline Wethington in the Public Affairs Office, ext. 2204.

—Penny Nichols

24th running of annual SLAC Run/Walk

HAVE YOU NOTICED AN increase in the number of runners on site lately? Every year about this time, more people spend their lunch hour running and walking. A terrific tradition continues at SLAC with the 24th running of the annual SLAC Run/Walk on Thursday, November 16, at noon. First prize winners will receive \$25 gift certificates from The Runners High in Menlo Park. Many more prizes will be awarded to both participants and spectators.

The SLAC Run/Walk along the klystron gallery was first organized in 1972 by Ken Moore, who would start the runners, jump into the pack himself, and finish in the top five. Ken placed first in 1972 and third in 1975. He could no longer run in 1982 but helped organize the event until leaving SLAC in 1990.

That first Run/Walk had 21 runners. The 1973 race had only 18 runners but after that the event grew steadily, attracting both SLAC and non-SLAC participants. The 1990 race had 95 finishers. Fierce competition from the outside caused the race committee to restrict awards to SLAC employee finishers only.

The first women participants ran in 1976 and for the next few



years some very fast non-SLAC women dominated the run. Since 1985 however, no one can touch SLAC's Dale Pitman. Dale won in '85, '86, '87, '88, and '89. Dale did not run in '90 or '91 but returned to win in '92 and again in '94. When she runs, she wins. There are some other strong women runners at SLAC but if Dale runs in '95 she is a clear favorite.

Can you do it? Not everyone who runs is competitive. After all, if you're a man and you want to win, you'll have to cover the 3.8 miles at better than six minutes per mile. If you're a woman, you have to do well under seven minutes per mile to catch Dale. Not many of us are up to that task. Many "middle of the pack" runners come out regularly to celebrate their fitness and

join the tradition. Many one-time speedsters continue to run for the fun of it after they can no longer keep pace with the leaders. Ken Witthaus and Bob Gex have yet to finish "in the money" but they have run in 20 or more of the 23 run/walks so far. Everyone's a winner at the SLAC Run/Walk.

If you want to run and have no medical reason not to then you probably can do it. Everyone is different but a rule of thumb is that you are in shape to run three times your daily average. For example: if you run three miles three times a week, you're averaging a little over a mile per day and should have no problem with the SLAC Run/Walk.

Why not walk? Walking has almost all of the advantages of running with almost none of the risks. If you walk briskly and aggressively you get a terrific workout without the body pounding inflicted by running. Walking has become an increasingly popular form of exercise and recent SLAC runs have always included a walking contingent.

Whether you race, run, jog, or walk, the SLAC Run/Walk can be a lot of fun. Join the rest of us on November 16 in continuing this great SLAC tradition. —Bob Traller

Announcing Tech Pubs Users Group

THE SLAC Technical Publications Department announces the formation of the Tech Pubs Users Group (TPUG), a monthly information-sharing forum, established with the goals of

- ◆ Facilitating communication of customer needs to Tech Pubs staff.
- ◆ Providing a basis for a common understanding of how electronic publication and the WWW affects publication at SLAC.
- ◆ Discussing recent and anticipated

changes in Tech Pubs policy affecting services provided.

- ◆ Sharing ideas and information about alternatives to discontinued services.
- ◆ Providing an opportunity for text-preparation and graphics experts to share solutions to problems commonly encountered in preparing documents.

The first meeting of TPUG will be held Tuesday, November 21, in the Orange Room (Central Lab, first floor)

You are invited

at 3:00 PM. Refreshments will be provided. Please come and bring your suggestions and your ideas.

—Kathryn Henniss